Collaboration as a Means of Assuring a Sustainable Human Resource Base

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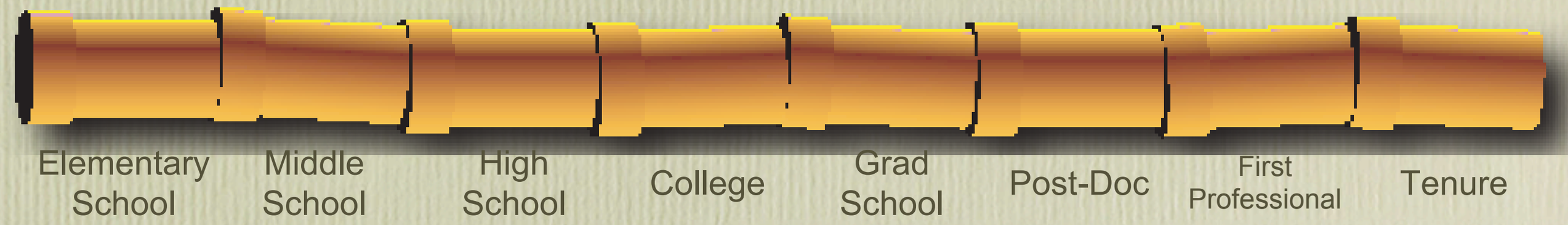
Technical Human Resources:

The Pipeline Model



- The pipeline leaks, and it leaks worst at the joints.
- Women and minorities leak out faster than others at every joint.
- Current approaches typically address the direction of flow approaching a joint, rather than the joint itself.

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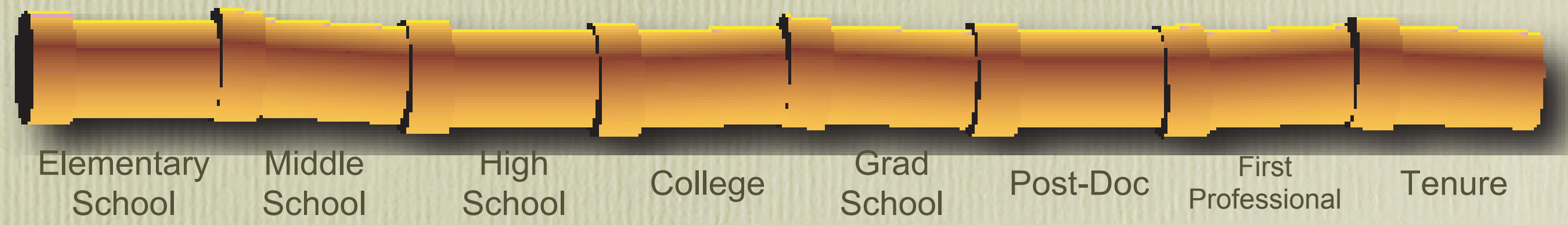
The Pipeline Model



- There are opportunities to collaborate at all points, but these opportunities become more closely aligned with the core missions of labs and universities at the "senior" end of the pipe.

- Understand the "4-year rule." Young people respect the advice provided by those who are older than they are, *but only by 4 years*.

- Time away from the lab is precious. Use it wisely.

Effective Means of Collaboration
for Human Resource Development

- First, foremost and always - RESEARCH PROJECTS
- Equipment support
- Lab staff as adjunct faculty
- Advisory committee service

Of Questionable Value...

- Accounting maneuvers to take advantage of low F&A cost structures at universities.
- Provision of hands-off data acquisition.
- Internet-enabled use of equipment.

Modes of Research Interaction

More intense faculty involvement

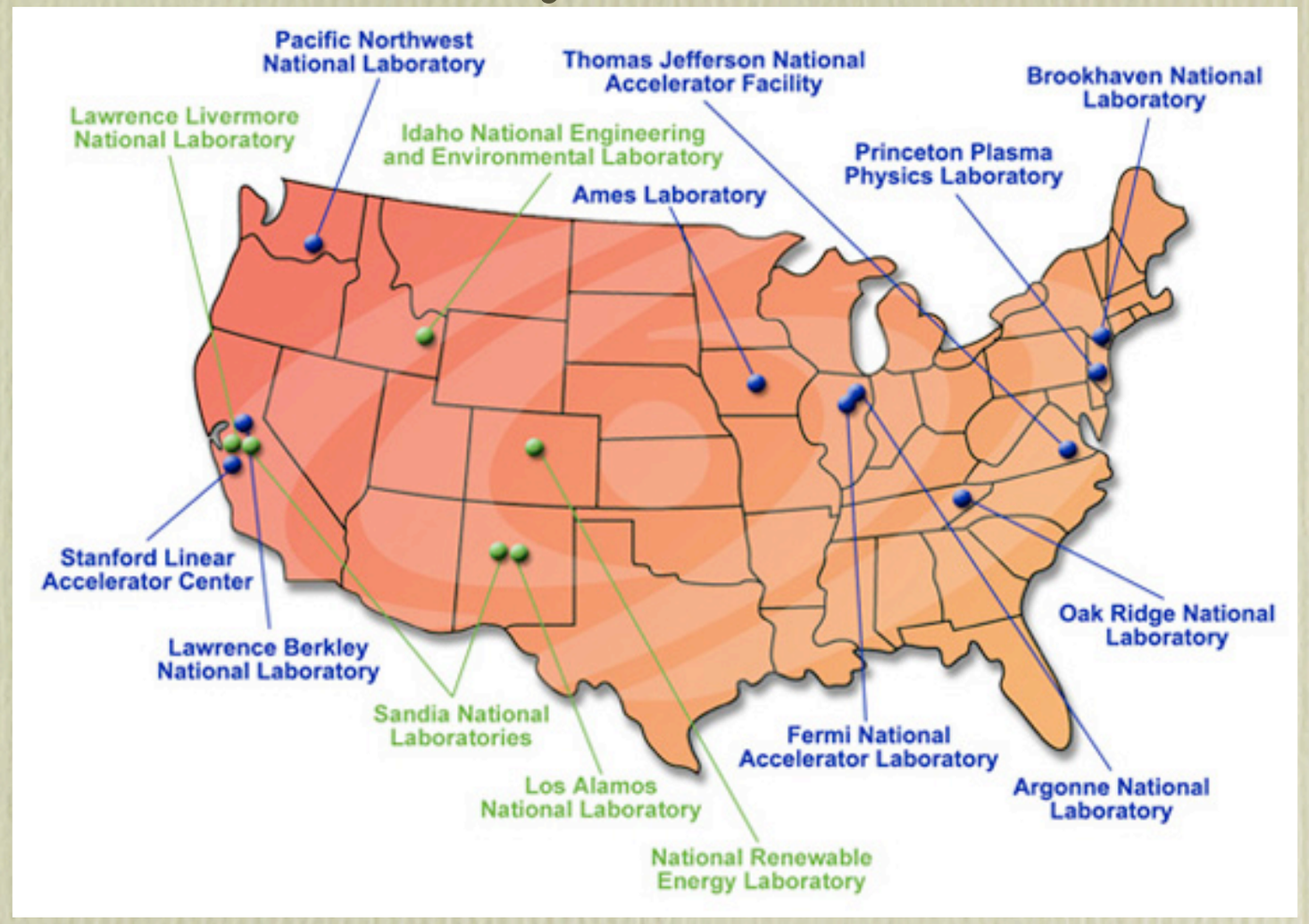
Greater tolerance for separation

- High-school science contest projects
- Undergraduate research / capstone projects
- MS and PhD Projects
- Faculty visiting appointments (short & long term)
- Post-doc projects
- Lab staff placements as visiting faculty

Proximity Effects

- Two-hour travel time is the maximum tolerable for certain kinds of interaction:
  - High-school science contest projects
  - Undergraduate research / capstone projects
  - Lab staff as adjunct faculty
- Four-hour travel time is the maximum desirable for certain kinds of interaction:
  - Graduate students in residence at a lab.

Proximity Effects - II



- Most of the highest-ranked university physics departments are close to national labs.

- Can the internet compensate for this effect? (I think not, so far anyway.)

Synergies

- Labs have state-of-the-art equipment and technical support.
- Universities have low cost-structures for personnel support; large supply of researchers.

Dissonances

- Post-docs, and more especially students need extensive supervision and training.
- Performance metrics for professors and lab staff differ significantly.
- Intellectual property issues.
- Foreign students & post-docs.
- Varying “courtesy appointment” practices.
- Lab vs. university pay scales, especially for post-docs.

Summary

- The best collaborations to support human resource development are those that reflect the prime missions of the partnering institutions.

- There are many possible modes of interaction. The most appropriate in any particular case will depend on numerous local considerations.

- Human resource development does not occur as an accidental by-product of research - it needs to be designed in to each project, and clearly and directly address a single "pipeline" node.

- Do those things for which you are the best-trained. Get expert help for the rest.